CLAIMS

What is claimed is:

	1	1. A method for supporting communication among a plurality of heterogeneous
	2	processing elements of a processing system, the method comprising:
	3	forming an interconnection network to support services between any two processing
	4	nodes within a plurality of processing nodes;
	5	utilizing a predefined data word format for communication among the plurality of
anes.	6	processing nodes on the interconnection network, the predefined data word format indicating
	7	a desired service; and
W W	8	arbitrating among communications in the network to ensure fair access to the
And and and any at any and and any and a feet of the any and a feet of the any and any and any and any and any and any and any	9	network by each processing node.
de la grave given graft og graft given til grave der de grave der de grave	1	2. The method of claim 1 wherein forming an interconnection network further
	2	comprises forming connections between each node in a grouping of nodes and between each
green.	3	of a plurality of groupings.
	1	3. The method of claim 2 wherein the grouping of nodes further comprises a
	2	grouping of four nodes.
	1	4. The method of claim 3 further comprising utilizing a matrix element as a

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processing node.

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- 5. The method of claim 4 further comprising utilizing a RISC element as a processing node.
- 6. The method of claim 1 wherein forming an interconnection network further comprises forming a network of connections to support services in a point-to-point manner.
- 7. The method of claim1 further comprising utilizing the interconnection network to support services between a node and a host processor external to the plurality of processing nodes.
- 8. The method of claim 7 wherein forming an interconnection network to support services further comprises forming an interconnection network to support a host DMA service, a node DMA service, a host read/write service, and a node read/write service.
- 9. The method of claim 1 wherein utilizing a predefined data word format further comprises utilizing a data word format that includes a service field, a node field, a tag field, and a data field.
- 10. The method of claim 9 wherein the data word format further comprises a 30-bit data word.

11. The	e method of claim 1 wherein arbitrating further comprises transferring priority
of access to the	interconnection network in a round-robin manner among the plurality of
processing node	≥S.

12. A system for supporting communication among a plurality of processing elements, the system comprising

a plurality of heterogeneous processing nodes organized as a plurality of groupings; an interconnection network for supporting data services within and among the plurality of groupings as indicated by a data word sent from one processing node to another; and

a plurality of arbiters for directing data word traffic on the interconnection network to allow fair and efficient utilization of the interconnection network by the plurality of heterogeneous processing nodes.

- 13. The method of claim 12 wherein each grouping in the plurality of groupings further comprises four processing nodes.
- 14. The system of claim 12 wherein the plurality of arbiters provide arbitration within and among each grouping in a token-based, round robin manner.
 - 15. The system of claim 12 further comprising a matrix as a processing node type.

1	16. The system of claim 12 further comprising a RISC processor as a processing
2	node type.
1	17. The system of claim 12 further comprising a host processor coupled to the
2	plurality of heterogeneous processing nodes via the interconnection network.
1	18. The system of claim 12 wherein the data word further comprises a plurality of
<u> </u>	bits organized as a services field, a node identification field, a tag field, and a data field.
	19. The system of claim 12 wherein the communications network supports DMA services and read/write services.
The second secon	20. A method for supporting communications among a plurality of processing elements, the method comprising:
3	organizing a plurality of heterogeneous processing nodes as separate groups of
4	processing nodes;
5	providing one set of wires to support a plurality of separate processing services
6	among and within each separate group;
7	communicating a data word that indicates the desired processing service from one
8	point to another point within the plurality of heterogeneous processing nodes via the set of

wires.

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- 1 21. The method of claim 20 wherein each separate group further comprises four 2 nodes.
- 1 22. The method of claim 21 wherein the four nodes further comprise three matrix elements and a RISC element.
 - 23. The method of claim 20 further comprising arbitrating within and among the separate groups of nodes for utilization of the set of wires.